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ANNUAL REPORT

ON

THE TOWNSHIP OF BERTIE

WATER SUPPLY SYSTEM

OWRC PROJECT 59-W-47



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BERTIE TOWNSHIP WATER SUPPLY SYSTEM

OPERATED FOR

THE TOWNSHIP OF BERTIE

BY

THE ONTARIO WATER RESOURCES COMMISSION

MR. A. M. SNIDER	-	CHAIRMAN
DR. A. E. BERRY	-	GENERAL MANAGER
MR. D. S. CAVERLY	-	ASSISTANT GENERAL MANAGER, AND DIRECTOR OF PLANT OPERATIONS
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PREPARED BY
THE DIVISION OF PLANT OPERATIONS



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I HISTORY

The plant delivers micro-strained chlorinated water to the Township of Bertie. The present year round population of the area is approximately 8,400. In the summer, the population triples due to the numerous summer cottages in the area and the tourist trade.

In 1958, the Township approached the Ontario Water Resources Commission to undertake the design, financing, construction and operation of a water intake and treatment plant. In October, 1960, construction began and in July, 1961 the Plant Operations Division of the Commission began the operation of the plant. The plant was officially opened on November 29, 1961.

The consulting engineers for the project were Canadian-British Engineering Consultants, Toronto and the resident engineer was Mr. M. Gibson. The OWRC construction engineer was S. Buszynski.

The contractors for the project were :-

Schwenger Construction - Burlington - The construction of the treatment plant and ancillary site works.

Dravo of Canada Limited - Toronto - The construction of the water intake and crib structure.

W. J. Storm Limited - Fort Erie - The construction of the water distribution main.

The design pumping capacity of the plant is 9,000,000 gallons per day and the approximate total cost of the project is \$ 775,000.

II DESCRIPTION OF THE PROJECT

Intake - The water from the lake enters the cribbed intake 17 feet below water level and travels through a 42 inch diameter corrugated iron pipe which is approximately 1800 feet long to the low lift station.

Low Lift Station - On entering the station, the water flows to two wells. Each well has two five foot square screens which prevent the entry of debris into the well.

The water is pumped from the wells by three vertical turbine pumps having a total ultimate capacity of 9,000,000 gallons per day to the treatment plant. Space has been provided so that an additional pump can be added in the future.

Treatment Plant - High Lift Station

Micro-strainer - In the treatment plant, the water passes through a micro-strainer which is a rotary drum 10 feet long and having a diameter of 10 feet. The water passes from the inside of the drum to the outside through a very fine stainless steel fabric having 165,000 openings per square inch. (Mark O Fabric) The strainer removes algae and suspended matter from the water.

During operation, the micro-strainer is continuously washed by a series of sprays. The wash water pump has a capacity of 330 GPM.

The original design included two micro-strainers but one micro-strainer was omitted for economic reasons. The one micro-strainer has a capacity of 4.5 million gallons per day.

THE HISTORY OF THE UNITED STATES

The history of the United States is a story of growth and change. From the first settlers to the present day, the nation has evolved through various stages of development. The early years were marked by exploration and settlement, followed by a period of rapid expansion and industrialization. The American Revolution and the Civil War were pivotal moments in the nation's history, shaping its identity and values.

The United States has a rich and diverse cultural heritage. The influence of different ethnic groups and immigrants has shaped the nation's character and traditions. The American dream, the pursuit of happiness, and the principles of liberty and justice are central to the nation's identity. The history of the United States is a testament to the resilience and ingenuity of its people.

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Clear Wells - From the micro-strainer, the water enters into two clear wells located below the high lift pumps. The capacity of the wells is 125,000 gallons.

Chlorination - Two chlorinators are used to chlorinate the water entering the clear wells. The chlorine dosage is automatically controlled by the flow of water.

High Lift Pumps - The high lift pumps supply the treated water from the clear wells to the distribution system. The pumps consist of two 2,500 US GPM, one 1,600 US GPM and one 600 US GPM capacity pumps. The downstream pressure is controlled by a butterfly valve operating off a pressure switch.

Facilities - The combined office and laboratory, wash-room and chlorinating rooms are also located in the treatment plant.

Distribution Main - Leaving the plant is a 14 inch main running north on Rosehill Road to Garrison Road and a 12 inch main running East on Garrison Road from Rosehill Road to Spears Road.

III PLANT OPERATION

(A) Flows - During the year a total of 696.578 million gallons was treated and pumped at an average daily flow for the year of 1,910,000 gallons per day. During the summer months there is a large increase in flow due to the increase in population and the normal increase in summer flow. A more detailed description of the flow is given in Table I.

(B) Treatment - The plant is equipped to micro-strain raw Lake Erie water before distribution. Micro-straining is primarily designed to control algae conditions and the equipment is performing this duty satisfactorily. Results of samples sent to the OWRC Laboratory for water analysis are shown on Table II.

(C) Chlorination - Chlorine is added to the micro-strained water to render the water bacteriologically safe for human consumption. A chlorine residual of approximately 0.3 ppm is maintained in the water leaving the plant. Daily tests are carried out for control purposes. A more detailed description of the chlorination is given in Table III. Bacteriological sampling is done on a weekly basis with samples being taken at the plant and in the distribution system and the test results are carefully studied.

(D) Power Consumption - During the year 1962 a total of 864,000 KWH was used at the plant at an average of 1.24 KWH per 1000 gallons of water. The cost of power was \$ 10,832.25 and it averaged \$ 0.016 per 1000 gallons. A more detailed description is given in Table IV.

(E) Plant Supervision - The staff at the treatment works are employed by the Ontario Water Resources Commission. At the end of the year 1962 the staff consisted of the following :-
Chief Operator -- W. Vye.

Operators -- C. Birley,
J. Donnelly,
J. Huffman,
E. York.

A spare man -- A. Hallman is kept on a part time basis. General duties of the staff consisted of the operation and maintenance of the low lift station, treatment works, high lift station and all equipment meters, buildings and grounds. They were also responsible for taking samples and carrying out various daily tests on the water. A 24 hour supervision was maintained throughout the year.

In addition to the supervision given by the local employees, the Division of Plant Operations of the OWRC, through its engineers and technicians maintained periodic inspection services and analyses of treatment records, provided assistance with special technical or equipment problems and general supervision. Approximately 11 visits were made by the project engineer during the year. The Head Office Maintenance Section made three visits to the plant which included the setting up of maintenance schedules and inspections of the buildings and equipment. The Head Office Electronics Section also made approximately 10 visits to the plant. Approximately thirty invoices were processed by the Head Office staff.

No part of the Head Office expense was charged to the project.

Congratulations are extended to the entire plant staff for the high quality of operation which was maintained throughout the year.

IV COST DATA

(A) Capital Cost - The tentative total construction cost for this OWRC project 59-W-47 was \$ 768,490.00 which was divided as follows :-

Intake and Grib Structure	\$ 146,462.00
Water Treatment Plant	459,600.00
Water Mains	135,646.00
Engineering	56,946.00
Land Legal and Survey	5,134.00
Miscellaneous	12,181.00
Capitalized Interest	12,651.00
Less Winter Works Subsidy	(60,130.00)
	<hr/>
	\$ 768,490.00

The latest figure for the total construction cost is \$ 763,763.37.

(B) Reserve for Contingencies - As of December 31, 1962 there was a total of \$ 8,132.05 in the reserve fund. The money in this fund is used in cases of emergency or major repairs. The money in this fund is earning interest at approximately $5\frac{1}{4}$ %.

(C) Operating Costs - The following is the operating budget for the year 1962 and the actual operating expenditures for 1962. A more detailed breakdown of the 1962 operating expenditures of \$ 36,196.63 will be in Table V.

	<u>Budget 1962</u>	<u>Expenditures 1962</u>
Payroll	\$24,800.00	\$ 20,999.27
Fuel	500.00	941.84
Power	15,200.00	10,884.90
Chemical	1,000.00	21.01
General Supplies	800.00	605.97
Equipment	400.00	346.50
Repairs and Maintenance	375.00	318.76
Sundry	1,000.00	1,146.55
Insurance	700.00	931.83
Contingency 10%	<u>4,477.00</u>	<u> </u>
Total	\$49,252.00	\$ 39,196.63

A total of 696.578 million gallons was treated at the plant and supplied to the Township of Bertie during the year 1962 at an average operating cost of \$ 0.052 per 1000 gallons.

TABLE I
FLOWS 1962

<u>MONTH</u>	<u>TOTAL FLOW M.G.</u>	<u>AVERAGE DAILY FLOW M.G.D.</u>
January	41.792	1.348
February	47.516	1.700
March	48.594	1.565
April	58.736	1.958
May	73.460	2.370
June	76.030	2.530
July	110.576	3.570
August	89.910	2.900
September	56.990	1.898
October	35.206	1.136
November	28.690	.957
December	29.078	.939
Year	696.578	1.910

NOTE:- The flow meter is operating at its lower range
and the accuracy of the meter is limited.

TABLE II
WATER ANALYSIS 1962

DATE			HARDNESS as CaCO ₃	ALKALINITY as CaCO ₃	IRON as Fe	CHLORIDE as CL	pH at Lab	TURBIDITY in Silica units
Mar.	6	a	134	104	0.16	22	7.4	3.7
		b	132	102	0.13	23	7.6	2.8
		E. c	130	106	0.24	23	7.7	2.8
		W. d	130	104	0.16	23	7.7	3.1
Apr.	2	a	120	92	0.43	21	8.0	4.0
		b	120	92	0.27	21	7.9	3.1
		c	120	92	0.43	21	7.9	3.1
		d	120	92	0.22	21	7.9	3.7
May	1	a	122	96	0.13	23	8.0	5.4
		b	126	96	0.19	23	8.0	4.0
		c	122	94	0.21	24	7.9	4.3
		d	122	96	0.21	23	8.0	4.3
June	5	a	128	100	0.32	22	8.0	3.7
		b	128	98	0.20	23	7.9	1.9
		d	126	96	0.25	24	8.0	1.6
July	4	a	134	102	0.22	23	8.0	4.7
		b	136	100	0.0	25	8.0	3.4
		c	136	100	0.0	25	8.0	2.2
		d	136	100	0.0	25	8.0	2.4
Aug.	1	a	130	104	0.06	23	8.2	
		b	132	100	0.04	22	8.3	
		c	130	104	0.06	23	8.2	
		d	132	104	0.08	22	8.2	
Sept.	5	a	130	98	0.05	23	7.6	1.9
		b	126	100	0.05	24	8.0	1.3
		c	126	100	0.05	25	8.0	1.0
		d	126	100	0.0	25	8.1	1.0

(b)

TABLE II
WATER ANALYSIS 1962

DATE		HARDNESS as CaCO ₃ ppm	ALKALINITY as CaCO ₃ ppm	IRON as Fe ppm	CHLORIDE as Cl ppm	pH at lab	TURBIDITY in Silica Units
Oct. 2	a	136	102	0.27	25	8.0	2.2
	b	136	100	0.10	26	8.1	6.4
	c	136	100	0.13	26	8.1	1.9
	d	130	100	0.10	27	8.2	2.4
Nov. 14	a	134	102	0.16	29	6.6	2.6
	b	134	100	0.05	27	7.3	1.1
	c	134	102	0.05	29	7.6	1.0
	d	134	100	0.05	28	7.8	0.7
Dec. 5	a	134	100	0.05	21	8.2	3.1
	b	134	98	0.00	22	8.2	2.2
	c	134	98	0.10	21	8.2	1.3
	d	134	100	0.05	21	8.1	1.9

NOTE:-

- a - Raw Water
- b - Treated Water
- c - Distribution System (East)
- d - Distribution System (West)

TABLE III
CHLORINATION 1962

MONTH	CHLORINE USED LBS	CHLORINE DOSAGE PPM	CHLORINE RESIDUAL AT PLANT. PPM	CHLORINE DEMAND. PPM
January	170	0.47	0.30	0.17
February	162	0.34	0.28	0.06
March	186	0.38	0.27	0.07
April	213	0.36	0.27	0.09
May	309	0.42	0.27	0.15
June	392	0.52	0.29	0.23
July	630	0.57	0.30	0.27
August	544	0.60	0.30	0.30
September	364	0.64	0.30	0.34
October	261	0.74	0.30	0.44
November	164	0.57	0.28	0.29
December	163	0.57	0.27	0.30
Year :-	3528			

TABLE IV
POWER CONSUMPTION 1962

MONTH	KWH	KWH PER 1000 GAL. WATER	KW DEMAND	COST	POWER COST PER 1000 GAL. WATER \$
January	71,200	1.70	329	1001.41	0.024
February	45,600	0.97	329	923.48	0.019
March	58,400	1.20	329	962.45	0.020
April	66,400	1.13	329	986.81	0.017
May	72,000	0.98	329	1003.85	0.014
June	71,200	0.94	329	1001.41	0.013
July	106,400	0.96	329	1108.58	0.010
August	98,400	1.09	279	964.97	0.011
September	75,200	1.32	230	777.47	0.014
October	67,200	1.90	209	703.04	0.020
November	67,200	2.32	209	703.04	0.024
December	64,800	2.21	209	695.74	0.024
YEAR	864,000	1.24		\$10,832.25	0.016

EXPENDITURES 1962

MONTH	EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	MAINTENANCE & REPAIRS	SUNDRY
JAN.	1532.78	1469.41	58.51	124.78		+175.00	33.04			22.04
FEB.	3238.06	1472.58	102.33	186.38	1009.96		21.89	346.50		98.42
MAR.	2920.72	1469.22	56.92	169.08	923.48		12.00		214.42	75.60
APR.	3067.61	1469.22	56.92	165.68	984.10	278.13	69.97			43.59
MAY	2677.42	1488.99	56.92	8.56	986.81	+ 20.19	70.21			86.12
JUNE	2444.17	1480.76	56.92	150.56	1014.29	+280.00			+117.42	139.06
JULY	2867.39	1486.09	257.26	6.58	1001.41		22.12			93.93
AUG.	4158.06	2238.45	189.68		1112.04	488.88	55.05			73.96
SEPT.	3406.36	1492.30	117.04	7.98	964.97	+301.03	66.29			*1058.81
OCT.	1949.75	1492.30	247.88	15.68	4.05	+ 31.99	123.38		28.00	70.45
NOV.	3609.79	1492.30	73.16	13.78	1480.51	208.13	36.63		175.65	129.63
DEC.	4324.52	2557.19	116.92	92.78	1403.28	+145.92	95.39		18.11	186.77
YEAR	36,196.63	19,608.81	1390.46	941.84	10,884.90	21.01	605.97	346.50	318.76	2,078.38

NOTE:-- + CREDIT

* INCLUDES INSURANCE

ONTARIO WATER RESOURCES COMMISSION
DIVISION OF PLANT OPERATIONS.
BERTIE TOWNSHIP WATER SUPPLY
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